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## USSR REPORT

## AGRICULTURE

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## CONTENTS

## MAJOR CROP PROGRESS AND WEATHER REPORTING

'TRUD' Reports Harvesting Difficulties in  
Krasnoyarskiy Kray  
(V. Surgutskiy; TRUD, 20 Sep 80) ..... 1

## POST HARVEST CROP PROCESSING

Principles of Grain Cleaning Operations Described  
(A. N. Pugachev, et al.; ZERNOVOYE KHOZYAYSTVO,  
Aug 80) ..... 2

## LIVESTOCK

Measures for Increasing Production, Raising Quality of Meat  
(A. Kalashnikov, A. Mysik; ZHIVOTNOVODSTVO, Aug 80) 7

Report on Beef Cattle Husbandry in Orenburgskaya Oblast  
(V. Malov; ZHIVOTNOVODSTVO, Aug 80) ..... 17

Progressive Technology for Beef Production Outlined  
(D. Levantin; ZHIVOTNOVODSTVO, Aug 80) ..... 22

Animal Husbandry Successes, Problems in Soviet North  
(M. Koshelev; SEL'SKOYE KHOZYAYSTVO ROSSII, Aug 80) 27

## AGRO-ECONOMICS AND ORGANIZATION

Problems of Equalizing Conditions of Economic  
Operations Discussed  
(Anatoliy Aleksandrovich Klyukach, V. Klyukach;  
EKONOMIKA SEL'SKOGO KHOZYAYSTVA, Jul 80) ..... 31

## TILLING AND CROPPING TECHNOLOGY

Measures for Improving Quality of Grain Discussed  
(I. P. Korobov; ZERNOVOYE KHOZYAYSTVO, Aug 80) ..... 40

MAJOR CROP PROGRESS AND WEATHER REPORTING

'TRUD' REPORTS HARVESTING DIFFICULTIES IN KRASNOYARSKIY KRAY

LD241309 Moscow TRUD in Russian 20 Sep 80 p 1

[KRASNOYARSKIY RABOCHIY Correspondent V. Surgutskiy "Reportage": "Skill Against Bad Weather"]

[Excerpts] Krasnoyarskiy Kray--The grainfields of Krasnoyarskiy Kray cover 2.28 million hectares. This year has caused local farmers many alarms. The cold spring delayed sowing for almost 2 weeks, sultry June scorched the shoots over large areas, and then persistent rain retarded the ripening of grain crops. And yet graingrowers in a number of regions have managed to grow a good harvest, despite the whims of the Siberian weather. Now they are endeavoring to gather it in quickly and without loss.

But this, unfortunately, is how things stand only in progressive farms and regions. In the Kray as a whole a strained situation has taken shape with regard to gathering the harvest. There is a shortage of motor transport, and some combines are still laid up--there are no machine operators.

Harvesting has begun particularly unhappily in Manskiy Rayon, where the daily area covered per combine in the first 10 days of September was only 2.2 hectares. This is the lowest indicator not only in the Kray but also in the whole of East Siberia. Many farms in Abanskiy, Sharypovskiy, Balakhtinskiy, Novoselovskiy and Uzhurskiy Rayons and in the Khakasskaya Autonomous Oblast have joined in harvesting in an unorganized manner. And yet the Siberian fall makes few days available for harvest work. Delaying harvest time means inevitable grain losses and failure to meet targets for fall plowing and for seed preparation for next year's harvest, every effort must be made to gather and preserve the harvest which has been grown.

CSO: 1824

## POST HARVEST CROP PROCESSING

UDC 633.1 664.7

### PRINCIPLES OF GRAIN CLEANING OPERATIONS DESCRIBED

Moscow ZERNOVOYE KHOZYAYSTVO in Russian No 8, Aug 80 pp 18-19

[Article by A.N. Pugachev, candidate of Agricultural Sciences and laboratory instructor at the Central Machine Testing Station, S.G. Demin, candidate of Technical Sciences and G.T. Kravtsova, engineer at the All Union Correspondence Institute of the Food Industry: "Grain Cleaning Principles"]

[Text] The quality of grain is conditioned by many biological, agro-technical, natural-climatic, technological, organizational-administrative and other factors, which quite often are interrelated one with the other. Thus, prior to undertaking measures aimed at improving grain quality, one must know the condition of the bulk grain being delivered to the farm threshing floors and grain receiving points from the hoppers of combines. We analyzed more than 8,000 samples of grain obtained from 16 oblasts in different zones of the country, in terms of moisture content and weed and grain impurities. In the process, we discovered that the grain being delivered to the kolkhoz and sovkhoz threshing floors and to the grain receiving points does not meet the basic conditions in terms of these three indicators (see Table 1, in percent).

In terms of weed impurities, the difference between the basic value and the actual grain condition for winter rye is 0.9 percent, winter wheat -- 0.8, spring wheat -- 2 and barley -- 0.2 percent; in terms of grain impurities -- the figures are 3.6 percent, 1, 1.8 and 1 percent respectively. In terms of grain moisture content, the difference (according to the maximum basic value) reaches 3 percent (spring wheat). However, from a practical standpoint it is important to know how the batches of grain are distributed in terms of moisture content and impurities and in definite gradations (quality standardized, restrictive and higher than the latter). Thus, in the case of winter wheat only 27.7 percent of the batches being received meet the basic conditions in terms of moisture content; winter wheat -- 32.8 percent; spring wheat -- 9.3 percent and barley -- 7.7 percent (see Table 2, in percent). Hence a considerable portion of the grain, especially that from spring crops, requires drying.

In terms of weed impurities, the basic conditions were met by 19.8 percent of the batches of winter rye grain, 10.9 percent of the batches of winter

Table 1

Indicator	Winter Rye	Winter Wheat	Spring Wheat	Barley
Moisture content	17.3	17.8	20.0	16.8
Weed impurities	1.9	1.8	3.0	2.2
including the seed of weeds	1.2	1.0	1.8	1.3
Grain impurities	4.6	4.0	3.8	3.0
including:				
cracked and crushed grain	2.2	1.8	1.9	1.7
puny grain	0.7	0.7	1.0	0.5
Basic conditions:				
weed impurities	1.0	1.0	1.0	2.0
grain impurities	1.0	3.0	2.0	2.0
moisture content	14-17	14-17	14-17	14-15
Restrictive conditions:				
weed impurities	5.0	5.0	5.0	8.0
grain impurities	15.0	15.0	15.0	15.0

Table 2

Moisture Content of Grain	Winter Rye	Winter Wheat	Spring Wheat	Barley
14.0 or less	7.4	13.7	3.2	2.9
14.1 - 15.5	9.4	12.6	4.4	4.8
15.6 - 17.0	10.9	11.9	1.7	9.6
17.1 - 20.0	18.0	27.5	7.0	39.3
20.1 - 23.0	18.5	17.7	38.6	22.1
23.1 - 30.0	23.1	13.7	44.2	20.2
30.1 or more	12.7	2.9	0.9	1.1

wheat, 5.3 percent of the batches of spring wheat and 52.3 percent of the batches of barley; in terms of grain impurities -- the figures were 2.8, 23.1, 20.2 and 18.3 percent respectively (see Table 3, in percent).

Deserving of special attention is the fact that a certain portion of the batches of grain does not conform even to the restrictive conditions in terms of impurities: for weed impurities, 6.5 percent of the winter rye, 18.9 percent of the winter wheat, 31.5 percent of the spring wheat and three percent of the barley; for grain impurities -- the figures were 2.1 percent, 0.9, 3.5 and 4 percent respectively.

In terms of weed impurities, the grain from spring wheat exceeded the restrictive conditions to the greatest degree. This underscores the need for devoting greater attention to the agricultural practices and technology employed in the harvesting of this crop, the growing area of which exceeds 40 million hectares throughout the country.

Table 3

Amount of Impurities in Batch of Grain	Winter Rye	Winter Wheat	Spring Wheat	Barley	Winter Rye	Winter Wheat	Spring Wheat	Barley
1.0 or less	19.8	10.9	5.3	1.9	2.8	1.8	2.0	2.9
1.1 - 2	44.7	20.6	27.2	50.4	5.3	6.6	18.2	15.4
2.1 - 3	16.8	25.6	20.2	19.2	12.7	14.7	14.0	28.7
3.1 - 5	12.2	24.0	15.8	20.2	28.8	33.5	34.2	27.9
5.1 - 8	3.7	14.7	13.1	5.3	32.3	27.4	10.6	14.4
8.1 - 15	2.6	2.9	12.3	2.4	16.0	15.1	17.5	6.7
15.1 or more	0.2	1.3	6.1	0.6	2.1	0.9	3.5	4.0

The efficient removal of impurities from grain requires knowledge of the fractional composition of the impurities. Weed impurities consist mainly (depending upon the crop, 56-63 percent) of the seed of weed plants and grain impurities include 38-57 percent cracked and crushed grain and 15-26 percent puny grain (see Table 4, in percent). It is apparent from the data cited that batches of winter rye and spring wheat produce the greatest amounts of damaged grain.

Table 4

Amount of Cracked and Crushed in a Batch	Winter Rye	Winter Wheat	Spring Wheat	Barley
1.0 or less	15.9	23.9	30.7	44.6
1.1 - 2	18.3	43.9	19.8	40.2
2.1 - 3	19.3	18.2	19.5	7.8
3.1 - 4	16.2	6.4	5.3	2.9
4.1 - 5	12.5	1.8	3.5	1.0
5.1 - 10	14.9	4.6	15.7	2.9
10.1 or more	2.9	1.2	5.5	0.6

The amount of puny grain (depending upon the crop, 66-92 percent of the batches having a content of up to 2 percent) and seed from weeds (54-87 percent) fluctuates to a lesser degree in different batches. Moreover, spring wheat contains more weed seed than does winter wheat, while more puny grain is found in batches of winter wheat.

How can the harvest moisture content of grain be reduced and impurities removed from it? No simple answer is available for these questions. This particular problem can be solved only through observance of the agro-technical, technological and organizational principles associated with the cultivation and harvesting of crops and also the post-harvest processing of bulk grain. It is impossible to completely eliminate contamination in bulk grain and yet a number of preventive measures are available for reducing such contamination to a considerable degree. These measures can

be carried out in two directions. The first -- noticeable improvements in the agricultural practices employed in grain production operations. High quality soil preparation work and sowing operations and the use of quality standardized high quality seed serve to promote simultaneous ripening of the grain crops and a reduction in the amount of puny and underdeveloped grains. Efficient agricultural practices reduce to a minimum the presence of weeds in plantings and, it follows, weed seed in the bulk grain; a level microrelief precludes the possibility of mineral impurities entering the hoppers of combines. The second direction -- improvements in the harvesting technology aimed at reducing its duration and observing an optimum work regime and the technological adjustments for the combines.

Unfortunately, the improvements in the agricultural practices for grain crops and in the technology for harvesting them are not being carried out in the same manner in various regions of the country. Thus, as the data for the past 5 years reveals, the degree and nature of contamination in freshly harvested grain, within one zone and even on the same farms, albeit on different fields and during different years, fluctuate considerably. Moreover, the fractional composition of grain impurities may be extremely diverse, especially with regard to the weed seed content.

Bunker grain is raised to the basic conditions during post-harvest processing, in accordance with the specific condition of each batch. During the past few years, definite organizational-technological post-harvesting processing methods have developed in a majority of zones throughout the country. The first stage -- initial processing. In those regions and on those farms where bunker grain has a low moisture content, such processing cannot be carried out. The second stage -- secondary processing for raising the grain to the quality standardized indicators.

Initial and secondary processing are based upon the principle that the batches must be close in terms of their quality characteristics, which are in need of improvement. Batches having sharply different quality indicators should never be combined, since owing to the fact that it is impossible to select a rational regime and optimum adjustments, this lowers the technological results of machine operations. The grain has to be passed through the machines repeatedly and thus quite often the desired results are not achieved.

In order to make efficient use of the technological potential of the machines, the bulk grain should be analyzed in advance for the fractional composition of the weed and grain impurities (unfortunately, this is not being done on some farms in the belief that it is nothing more than a meaningless waste of time). An analysis of a bulk sample weighing 1.5 to 2 kilograms is carried out on laboratory sieves (attached to a machine). Subsequently, a set of sieves deemed appropriate for the particular batch is selected and they are installed in the machine. A test cleaning is carried out with a rational regime being selected and the effectiveness of the cleaning is checked based upon an analysis of samples drawn from the appropriate outputs. When

necessary, the sieve is replaced and the work regime of the machine made more precise. In the process, it must be remembered that the primary cleaning is a separating out of only the light and coarse impurities, with no losses in the form of waste products of any grain of the basic crop. Experience has shown that primary processing makes it possible to lower the moisture content of a contaminated batch by 1-3 percent or more.

In the case of initial cleaning involving an increase in the moisture content and contamination of the initial material, the productivity and quality of machine operations are lowered. In such instances the workload of the machines is less than it would be for the processing of dry and relatively clean grain.

At the present time, use is being made of separate grain cleaning machines, grain cleaning units, grain cleaning and drying complexes and points for carrying out the post-harvest processing work. Unfortunately, not all of the farms have cleaning and drying complexes (KZS-5, KZS-10B, KZS-20B, KZR-5) or points which are capable of being operated on the basis of several technological variants. Greater use is being made of cleaning units (ZAV-10, ZAV-20, ZAV-40, AZS-30, AZS-30M and ZAR-5) and also separate air-sieve (OVP-20A) and air-sieve-grain cleaning (OS-4.5A) machines. On a number of farms, use is being made of the mobile OVP-20A (self-propelled) thrashed heap cleaner for the initial cleaning of grain; it has two parallel operating sieve boots (each having four sieves) and an air cleaning unit. The machine has 36 interchangeable sieve beds, including eight round ones thus ensuring its multi-purpose operation.

The post-harvest processing of grain is a complicated and laborious process. In order for it to be carried out in the most efficient manner possible, each farm should ideally carry out a complete analysis of the data for the past 5-7 years, concentrating on the delivery schedules and volumes and particularly the quality of the grain (moisture content and weed and grain impurities according to fractions). This data will aid in determining the types and degree of processing to be employed and, it follows, the number and types of grain cleaning and sorting machines to be used and also in developing all of the possible variants for the technological cleaning systems.

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## LIVESTOCK

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### MEASURES FOR INCREASING PRODUCTION, RAISING QUALITY OF MEAT

Moscow ZHIVOTNOVODSTVO in Russian No 8, Aug 80 pp 5-8

[Article by A. Kalashnikov, VASKhNIL academician and A. Mysik, doctor of Agricultural Sciences: "Scientific Principles for Increasing the Production and Raising the Quality of Meat"]

[Text] The decisions handed down during the June (1980) Plenum of the CPSU Central Committee are serving as a new stimulus for the creative endeavors of scientific workers. In the report delivered before the Plenum by Comrade L.I. Brezhnev, mention was made of the need for applying a maximum amount of effort towards ensuring the successful fulfillment and over-fulfillment of the plan for the final year of the Tenth Five-Year Plan and for establishing a reliable foundation for stable operation of the national economy during 1981. More and more scientific collectives are joining in the preparatory work for the 26th CPSU Congress. The object of their special concern is that of increasing the production and improving the quality of meat and meat products.

The country's scientific institutes have carried out extensive studies aimed at developing effective methods for obtaining high quality meat. These studies are based upon an analysis of the principles underlying the growth and formation of the meat productivity of agricultural animals and upon the effect of genetic and ecological factors on the quality of the products.

The quality of meat is described by a number of indicators bearing upon its food, biological and technological value. Moreover, the chief criterion for meat value is its ability to satisfy the requirements of the human organism for the more important nutrients, particularly full value protein. Of the biological factors affecting the quality of meat, the following should be singled out first of all: type of animal, strain, type, line, cross, age, season of birth and their sex and of the technological factors -- the level and type of feeding, the full value nature of the rations, the system of maintenance and the conditions for transporting and slaughtering the animals, processing them and storing and selling the products.

Beef is produced mainly by means of dairy and composite strains of cattle, the proportion of which amounts to 94-95 percent. Specialized meat strains

account for only five percent of the beef. Such a ratio between the dairy and meat strains in cattle husbandry determines the beef production technology to be employed throughout the country. For pork production, use is being made mainly of the large white strain, which constitutes more than 80 percent of the pedigree structure, Landrace and other strains of zonal importance; mutton -- sheep of the fine-fleece, semi-fine-fleece and coarse wool strains.

The quality of the livestock being added to the state's resources is constantly being improved. At the present time, the large-horned cattle being procured throughout the country are for the most part adjudged to be in a state of high or medium nourishment. In 1979 the average live weight of the animal's so delivered was as follows: large-horned cattle -- 358 kilograms, hogs -- 104 kilograms, sheep -- 37 kilograms. However, large quantities of livestock are still being delivered at low live weights.

The organization of intensive raising and fattening of young large-horned cattle stock represents one of the principal reserves for increasing the production and improving the quality of beef and it is of considerable national economic importance. Studies carried out at VIZh [All-Union Scientific Research Institute of Livestock Breeding], VNIIMS [All-Union Scientific Research Institute of Beef Cattle Husbandry], NIIZh [Scientific Research Institute of Livestock Breeding] for the Forest-Steppe Region and the Forest District of the Ukrainian SSR, BelNIIZh [Belorussian Scientific Research Institute of Livestock Breeding], SibNIPTIZh [Siberian Scientific Research and Planning Technological Institute of Livestock Breeding] and other scientific institutes have shown that the substitution of an intensive technology for the raising of livestock in place of the traditional extensive one will make it possible to raise the effectiveness of meat production to a considerable degree and improve its quality. The fattening of young stock is especially effective. Compared to adult animals which have completed their growth, more protein and less fat accumulate in the bodies of the young stock. The feed expenditures per unit of weight increase in young animals are lower than that for adult animals. Under intensive growth and fattening conditions, the young stock attain a live weight of 420-450 kilograms or more by the time they are 14-16 months of age.

A comparative evaluation of the young stock of certain dairy and composite strains in terms of their meat qualities, conducted by VIZh, has revealed that substantial differences exist among the strains. At 14 months of age, the greatest live weights were registered by young stock of the Sychevka (543 kilograms), Shvitskaya (474 kilograms) and Simmental'skaya (470 kilograms) strains. These animals yielded the greatest amount of freshly killed carcass weight. According to data supplied by BelNIIZh, these indicators were best in the case of young stock of the Simmental'skaya strain.

Scientific studies underscore the fact that the intensification of fattening operations makes it possible to lower feed expenditures per unit of output by one third. A decisive condition for such intensification is the creation

of a strong feed base and the organization of full-value feeding. It is known that the level and type of feeding can accelerate or restrain growth and development in the individual tissues of an organism, as a result of which it is possible to obtain, at a definite age, not only animals that differ in weight but also having different carcass qualities. During a series of experiments carried out at VIZh and other institutes, it was established that the raising and fattening of livestock at a continuously high level of feeding serves to promote increased growth of muscular tissue and reduced deposits of fat on the carcasses.

The quality of beef is definitely affected by the maintenance technology employed. According to data supplied by the Scientific Research Institute of Livestock Breeding for the Forest-Steppe Region and the Forest District of the Ukrainian SSR and SibNIPTIZh, the meat of animals raised under the loose housing system of maintenance contains reduced quantities of intramuscular fat and greater amounts of biologically valuable protein. During an experiment carried out at SibNIPTIZh, 15 month old bulls maintained under the loose housing system had a live weight of 437 kilograms and their meat (stuffing) contained 19.9 percent protein and 11.7 percent fat. For non-loose housing maintenance, the figures were 18.3 percent and 16.3 percent respectively.

At the same time, it should be borne in mind that under the loose maintenance system labor productivity increases sharply and an increase takes place in feed expenditures per unit of output. This results from the raised energy expenditures required for movement of the animals and also owing to the effects of certain stress factors.

Studies carried out by many scientific institutes throughout the country have revealed differences in the intensity of growth and in the quality of the meat of castrated and non-castrated bulls. In an experiment conducted at SibNIPTIZh, Siberian bred bulls of the black-variegated strain were found to have a higher intensity of growth than castrated animals. Compared to an average weight of 544 kilograms for 18 month old bulls, the castrated animals weighed only 465 kilograms, or 11.7 percent less. The bulls produced less fatty and calorific meat than the castrated animals. The taste qualities of the meat and the protein quality indicator of the latter also turned out to be higher. The feed expenditures per kilogram of increase in live weight in the castrated animals were greater by 16-18 percent than those for the bulls.

Taking into account the trends in scientific-technical progress in animal husbandry and feed production, the USSR Ministry of Agriculture and VASKhNIL [All-Union Academy of Agricultural Sciences imeni V.I. Lenin] consider it advisable to implement the following principal conditions for a progressive technology in the production of beef:

...intensive raising and fattening of young large-horned cattle stock with a live weight of 400-450 kilograms being reached at the age of 16-18 months;

in order to use the maximum of the available feed. In the final period of fattening, the cattle should eat a diet of grain and hay (straw, haylage, etc.).

One type of feeding is a predominance of grain on finishing feeds, with an optimum expenditure of concentrates of 10-12 percent on a daily weight increase during the final stage of fattening (100-120 kg). In the beet growing and potato production regions, attention should be made of the waste products of the food industry (pulp and sugar beet pulp).

In order to raise the average daily live weight, i.e. the weight and lower feed expenditures per unit of output, use will be made of castrated animals for fattening purposes.

A great amount of attention should be given to improving the pasturing of young stock and adult animals for just as cattle out on natural feed lands, especially in the regions of Kazakhstan, the north Caucasus, the Urals, the Volga region and in Siberia. This will promote a reduction in the production costs for beef and improvements in the quality of the beef.

More extensive use must be made of crossing of dairy cows with bulls of meat strains. This method will promote an increase in production and an improvement in the quality of the beef. Based on previous studies carried out in various areas of the country, a number of combinations have been developed between castrated bulls and composite strains on the one hand and bulls of meat strains on the other. For example, work has been carried out for a period of many years at BelAZH in connection with the crossing of cows of the black-variegated strain (imported extensively in our country) initially with bulls of British strains -- Hereford and Aberdeen Angus and subsequently with the large meat strains of France -- Charolaise, Limousin and Montbeliar and of Italy -- Romagna. Fifteen crossing variants were studied.

It was established that the animals created from the different crossing variants surpassed black-variegated cows at the same age in terms of weight increase, quality of meat, feed requirements and other indicators.

Similar studies were carried out at VIZU, Almaty, Kelen for the Forest-Steppe Region and Forest District of the Urals and others. It was established that the meat productivity of animals increases an average of up to 10 percent and at times up to 15 percent and that the quality of the meat is higher with less feed expenditures per unit of weight increase than that for animals of dairy and composite strains.

However, it should be borne in mind that this method cannot be recommended for all farms. In connection with the conversion of dairy cattle husbandry over to an industrial basis, many of these farms are experiencing difficulties in reproducing the dairy herd -- the result of increased culling out of cows, a raised degree of barrenness and a reduction in the preservation of calves.

As a result, the dairy herd is not always assured simple reproduction. On such farms, the crossing of even just a small portion of the dairy herd with bulls of meat strains, for the purpose of obtaining hybrids, is forbidden.

Large-scale organizational and economic measures are required in order to accelerate the development of specialized beef cattle husbandry as a source for the production of high quality beef. In the near future, the number of beef cattle should ideally be increased considerably and intensive methods for the management of this branch should be introduced into operations.

Fine conditions for the development of beef cattle husbandry are to be found in the steppe regions of Kazakhstan with their large tracts of pasture land and also in the foothills and mountainous regions of Central Asia, the Trans-Caucasus and a number of krais and oblasts in the RSFSR.

The experience of leading farms in the Ukraine, Belorussia and certain oblasts in the RSFSR (Kostovskaya, Volgogradskaya, Voronezhskaya oblasts and Stavropol'skiy Kray), where in recent years farms have been created for the breeding of beef cattle, has shown that with proper organization it is feasible and economically effective to breed beef cattle even in zones of intensive farming and feed production.

In order to accelerate the development of beef cattle husbandry, specialization in the breeding of beef cattle must be implemented on farms and in cattle regions and the mass crossing of local animals with bulls of meat strains must be organized.

The scientific research institutes have developed and are further improving a system for creating blood stock for meat strains, based upon inter-strain crossings. Recommendations are available on the selection of strains for the purpose of obtaining two and multi-strain hybrids, distinguished by high productivity.

The quality of beef is dependent to a considerable degree upon the trends in breeding-selection work with beef strains, the purpose of which is to improve existing strains and to breed large animals having a beef type structure and capable of furnishing beef having good culinary qualities at the age of 15-18 months.

Of the successes achieved by the animal breeders in beef cattle husbandry in recent years, the creation of two types of beef cattle in the Ukrainian SSR -- Chernigovskiy and Prisnianskoye -- is deserving of special mention. These highly productive types were created by scientists of NIIZh for the Forest-Steppe Region and the Forest District of the Ukrainian SSR and the Ukrainian Agricultural Academy, in collaboration with animal husbandry specialists. Bulls of the Chernigovskiy type have a live weight of 361-429 kilograms at 12 months of age and heifers -- 300-364 kilograms.

The animals of the new types retain a high speed of growth up to 2-2.5 years of age. They furnish good feed remunerations in terms of weight increase and their carcasses contain relatively small quantities of fat. The Chernigovskiy type of cattle was bred with a predominance of inherited traits from the Charolaisne strain and the Pridneprovskiy type -- the Kianskaya strain.

In 1979, five new plant lines of the Hereford strain were approved in an order handed down by the USSR Ministry of Agriculture. These lines were bred by scientists of VNIIK, SibNIVCIZh and AltayNIPTZh [Altay Scientific Research and Training Technological Institute of Livestock Breeding], with the participation of specialists from breeding farms. The bulls of the new lines, in terms of their speed of growth, are at the level of the world standards (average daily weight increase of 1,400 grams or more).

Great prospects for the future are opening up based upon studies on the breeding of hybrid herds, through the use of bisons, Indian buffalo, European bisons, yaks and Anatolian oxen, in order to create animals that will be used for various special purposes -- for regions of intensive beef cattle husbandry, for semi-restricted maintenance in semi-deserts and on forest and shrubbed pastures and for alpine cattle husbandry operations.

Pork occupies and will continue to occupy a high proportion of the country's meat balance. The population is presenting raised requirements for pork. Thus, at the present time improvements are being carried out in the existing strains, while new strains of hogs, mainly meat strains, are being bred. Successful work is being carried out in this regard. However, it should not be forgotten that the demand for high quality fatty pork is not abating.

Work has been completed in hog farming operations with regard to evaluating the fattening and meat qualities of 17 domestic strains, one pedigree group and 10 specialized types. On the average for all of the groups, the age for attaining a live weight of 100 kilograms -- 195 days, the average daily weight increase -- 707 grams, feed consumption per kilogram of weight increase -- 3.7 feed units and the content of meat in a carcass -- 57 percent. Considerable advances have been achieved in the meat content found in hog carcasses of the Ukrainian Steppe White, Kirovograd and North Caucasus strains. The principal strains at the present time are: the Large White, Landrace, Lithuanian White and Latvian White. These strains differ very little in terms of their meat qualities. The newly created meat types of hogs -- Kemerovo, Donskaya and Poltava -- are distinguished by a raised meat content.

The hogs of domestic strains are distinguished by strong constitutions, natural resistance and reproduction qualities. Great potential opportunities are available for further improving each of these strains. In the presence of biologically rich feeding and optimum maintenance conditions, these strains are capable of furnishing an average daily weight increase of 700-800 grams under a controlled fattening regime, with feed expenditures of 3.6-4.0 feed units per kilogram and for industrial complexes -- 630-660 grams and 4.2-4.3 feed units respectively.

Studies on the dynamics of growth and development of muscle, fat and bony tissue, carried out at the Poltava NII, have shown that in hogs of such widely-distributed strains as Landrace (bacon type), Large White (meat-fat) and Mirgorod (fat), the increase in muscular tissue is considerably up until 6 months of age. It is roughly at this age that the strain characteristics become especially apparent. The amount of fat tissue begins to predominate over the muscular tissue in Landrace hogs at the age of 7.5-8.0 months, the Large White strain -- 7-7.5 months and the Mirgorod strain -- 6.5-7.0 months. The intensity of the increase in bony tissue decreases as their age increases.

Increased production and improvements in the quality of the pork will be realized by means of branch intensification, by raising the average daily increases in live bulk, by improving the quality of the meat, by lowering feed expenditures per unit of output, by creating new and highly productive strains, types and lines of meat type hogs, by making extensive use of the heterosis effect in connection with industrial crossings and hybridization, by lowering the age at which a live weight of 115-120 kilograms is attained and by raising the delivery weights.

The intensive selection of hogs for meat content on the one hand and the use of industrial methods in hog farming on the other (high concentration of animals, early weaning, absence of motion, mechanization and automation of production processes and so forth) bring about a reduction in the disease resistance of the animals and also a deterioration in the quality of the meat.

Quite often the cardio-vascular, hormonal and nervous systems of meat hogs prove to be inadequate and their capability for temperature control is limited. Hogs which are predisposed to stress produce sub-standard pork that is pale in color and has signs of exudation.

In order to prevent a lowering of the quality indicators, the selection for raised meat content must always be supported by data on the quality of the pork during slaughtering. The required level of pork quality can be maintained only by means of systematic control. In this regard, a greater role is played by the rich feeding of the hogs. The development of detailed feeding norms, taking into account the trends in their productivity, is of great importance both from the standpoint of improving the quality of the pork and also with regard to lowering the stressors and raising the increases in live weight as well as the remuneration realized from feed expenditures. With regard to the problem of developing detailed norms for hogs, successful work is being carried out by the scientists at VIZh, the Poltava NII, SibNIPTIZh and other scientific institutes.

The production of pork at large-scale industrial complexes will be based mainly upon the use of concentrated feeds and thus an increase in the production of full ration, high quality mixed feed is viewed as a mandatory condition for intensification of the branch. On small and medium-sized

farms, the hog ration will contain considerable amounts of grass meal, potatoes, waste products obtained from vegetable production operations and green feed. In the feeding of hogs, use should necessarily be made of food remnants and the waste products obtained from the dairy and food industry.

Sheep raising operations offer great opportunities for increasing the production of meat. However, up until recently the introduction of mechanization into the production processes in this area has been less than in other branches of animal husbandry and only limited use has been made here of the achievements of scientific-technical progress and leading experience. In a number of large sheep raising zones, the development of the branch continues to be dependent upon the weather conditions.

Mutton occupies approximately 6 percent of the country's overall meat balance. The increasing demand for mutton is promoting the development of a highly productive branch -- meat and wool sheep raising. This development is taking the form of improvements in the meat qualities of the animals, in their early maturity and fruitfulness and in the fattening and grazing of the sheep.

It was only during the years of Soviet rule that semi-fine-fleeced meat and wool sheep raising operations developed in our country. Eight new strains and six pedigree strains were bred during this period. Soviet scientists developed the theoretical principles for the breeding and raising of semi-fine-fleeced meat and wool strains. Crossings of fine-fleeced, coarse wool hybrids and fine-fleeced sheep with rare of foreign and domestic meat and wool strains are being carried out for the purpose of rapidly increasing the numbers of meat and wool sheep. As a result, large groups of meat and wool sheep have been created.

A most important task confronting the scientists and specialists is that of accelerating selection work aimed at achieving the best combination of high wool productivity, good early maturity and meat qualities, raising mutton production on the order of 35-40 kilograms for each ewe of a fine-fleeced or semi-fine-fleeced strain and 100 kilograms for the Romanov strain and also the breeding of new strains, types and lines with yields of 45-50 kilograms of meat per ewe.

The intensification of sheep raising operations requires improvements in the use of natural feed lands, the creation of cultivated and irrigated haying and pasture lands, completely mechanized sheep raising farms and fattening sites and complete support for all of the animals in the form of food, including reserve supplies.

In the interest of reducing losses during the transporting of the sheep to meat combines, more extensive use must be made of railroad and motor vehicle transport facilities, the production of the required amounts of specialized transport equipment must be accelerated and an increase must take place in the production capabilities of meat combines and mobile sites engaged in the slaughtering and processing of sheep.

Ideally the procurement organs must give thought to and solve the problem having to do with the acceptance of the livestock directly at the farms and transporting them to the meat combines using their own specialized transport equipment.

In the interest of raising the quality of the meat, the scientific institutes must concentrate their efforts on the following:

- ...develop systems for the biologically rich feeding of the animals;
- ...uncover opportunities for utilizing new types of feed and feed additives, in order to raise the level of meat productivity and the nutritional and biological value of the meat and meat products;
- ...implement improvements in the norms and types of feeding for the various age and sex groups of meat livestock, so as to ensure an optimum ratio of protein and fat in the carcasses, while taking into account the pedigree characteristics of the animals;
- ...reveal the genetic potential of large-horned cattle, hogs and sheep, study the influence of environmental factors on the effectiveness of converting feed nutrients into the nutritional protein of meat;
- ...improve existing and breed new strains of large-horned cattle, hogs and sheep in different zones throughout the country such that, in addition to high meat productivity, the animals will be distinguished by a raised quality of output and reduced feed expenditures per unit of increase in live weight;
- ...introduce effective methods of selection aimed at raising the dressing percentage and protein and fat content in the meat and also at improving the technological properties of the meat in conformity with the requirements of various branches of the meat industry;
- ...develop more effective measures for combating diseases in large-horned cattle, sheep and hogs and their poisoning by different types of substances (pesticides, mycotoxins) and also methods for appraising the products obtained from slaughtering the animals;
- ...create an efficient system for the pre-slaughtering preparation and transporting of the animals in the interest of ensuring the best preservation of the quality of the meat products;
- ...improving the means and methods for maintaining the equipment at enterprises in the meat industry in good sanitary condition;
- ...develop and introduce instrument express-methods for conducting an objective evaluation of the quality of beef, pork and mutton;

...develop growth and other enrichment agents for the meat and raise the output of finished products, while retaining high indicators for their nutritional value and organoleptic properties;

...introduce progressive forms for the organization and economic stimulation of the labor of workers on farms and at industrial complexes and meat combines, which will ensure an increase in production efficiency and improvements in the quality of the meat and meat products;

...develop and standardize highly sensitive methods for detecting pesticides, medicinal preparations, preservatives and other foreign substances in the meat and meat products and establish the maximum permissible concentrations for them, taking into account their toxicological and technological effects;

...carry out veterinary-prophylactic, zoohygienic and sanitary-hygienic measures at animal husbandry farms and enterprises of the meat industry, which will serve to ensure that high quality meat will be obtained;

...improve the State Standard for slaughtered cattle and for evaluating the quality of meat and meat products.

These problems, which are aimed at improving the quality of animal husbandry output, must be included in the subject plans of the scientific institutes.

A most important task confronting the agricultural science is that of intensifying scientific studies aimed at increasing the production and improving the quality of meat.

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### REPORT ON BEEF CATTLE HUSBANDRY IN ORENBURGSKAYA OBLAST

MOSCOW ZHIVOTNOVODSTVO in Russian No 8, Aug 80 pp 15-16

(Article by V. Malov, deputy chief of Agricultural Production Administration of the Orenburgskaya Oblast Executive Committee: "Beef Cattle in Orenburgskaya Oblast")

[Text] Orenburgskaya Oblast is a traditional zone of beef cattle husbandry. Since 1966, beef cattle husbandry in the oblast has operated as an independent branch of cattle husbandry.

During this period the number of beef cattle increased from 88,600 to 200,800 head, or by a factor of 2.3, including cows -- from 25,500 to 68,700 head, or by a factor of 2.6; more than 12 percent of all beef cattle in the RSFSR are concentrated in this oblast.

The beef cattle are raised and bred in 10 rayons in the eastern and southern zones of the oblast, at 30 large-scale specialized sovkhozes and on 52 kolkhoz and sovkhoz farms. A negligible number of such cattle, mainly beef hybrids, are to be found in other rayons. On the average, one specialized establishment maintains 1,320 cows and one farm -- 550.

In connection with the conversion of the branch over to an industrial basis, large-scale reproduction farms having 2,000-2,500 or more cows (Ural'skiy, Belogorskiy, Anikhovskiy, Sagarchinskiy, Teploverskiy and other sovkhozes) are being created in the regions of beef cattle husbandry.

Fine solutions are being obtained for the problems concerned with the specialization and concentration of beef cattle husbandry in Adamovskiy, Belvayevskiy, Akbulakskiy and Pervomayskiy rayons. During the past few years, a number of facilities have been built and placed in operation throughout the oblast: nine beef complexes for 8,400 cows, one complex, one farm and three specialized farms for the specialized raising of heifers; 47 interenterprise mechanized fattening sites for 144,500 head. By the end of this current year, the capabilities of the complexes will have been raised to 9,000 cows and those of the fattening sites -- to 155,000 head. The

capabilities of the spetskhозes [specialized farms] will also be increased. The farms in Sol'-Iletskiy and Kvarkenskiy rayons achieved fine indicators in beef cattle husbandry last year; they obtained 85-87 calves from 100 cows and their average daily weight increase for young horned-cattle stock was 600 grams. In 1979, 97-105 calves were obtained from 100 cows at the Burtinskiy, Sputnik and imeni Tsvilling sovkhozes and even greater indicators were achieved by individual livestock breeders.

In 1979, meat production at the industrial complexes of the Ural'skiy, Sputnik, Sagarchinskiy and Mayskiy sovkhozes amounted to 101-108 percent of the plan, the average daily weight increase for young stock was 679-765 grams, 91-105 calves were obtained from 100 cows, with the average live weight of the calves being 200-210 kilograms upon being separated from their mothers.

In 1979, the fattening sites produced 192,200 head of young large-horned cattle stock, the average live weight of which was 398 kilograms, and 62 percent of the cattle were delivered in a high state of nourishment. The average daily increase in weight was 640 grams, the sites produced 36,293 tons of gross weight increase and 150,500 head of cattle were delivered at raised live weights. As a result, the state paid out bonuses amounting to 33.7 million rubles to the shareholder-farms, in addition to the basic price.

The fattening sites furnish 47 percent of all beef being procured in the oblast. The production cost for 1 quintal of weight increase at the sites was 125 rubles, feed unit expenditures -- 11 quintals and labor expenditures -- 8 man-hours. The sales price for a quintal of meat -- 169 rubles. At sites in Tashlinskiy, Adamovskiy, Svetlinskiy, Sakmariskiy and a number of other rayons, the average daily increase in weight reached 762-890 grams, the average delivery live weight for the animals was 416-438 kilograms, 85-91 percent of the cattle were delivered in a high state of nourishment and the production cost for 1 quintal of weight increase was 98-127 rubles.

Last year, a specialized team at the Tashlinskiy Interenterprise Fattening Site, consisting of four men and headed by State Prize Laureate A. Grigor'yev, fattened 1,574 calves, the average live weight of which was 416 kilograms. Moreover, 85 percent of the animals were delivered in a high state of nourishment and following an average daily weight increase of 913 grams.

Fine heifers are being raised at the complex-spetskhоз of the Avangard Sovkhoz. From here the heifers are sent to commercial farms at a live weight of 380-396 kilograms; 85 percent of the animals are classified as being of elite-record or elite class.

The breeding network for beef cattle husbandry in the oblast is represented by three breeding sovkhozes and nine breeding farms of sovkhozes (26,700 head of pedigree beef cattle, including 11,700 cows). Each year the

breeding farms sell 800-900 pedigree bulls and 2,500-3,000 young heifers to the commercial farms and beyond the borders of the oblast. This year the number of cattle at breeding farms will increase to 33,200 head.

Since 1976, the intensive raising of beef young stock has been underway at beef farms throughout the oblast in the interest of branch intensification. This has made it possible to raise the average daily increase in weight from 496 grams in 1976 to 584 grams in 1979. Use is being made of non-grazing, fixed and summer-camp maintenance for the beef calves, with controlled triple-phase feeding (nursing) of the mothers' milk and additional feedings of fodder, hay and concentrates. Last year, 30,200 beef calves were raised on an intensive basis throughout the oblast; their average daily increase in weight was 772 grams, or 165 grams higher than the figure for conventional raising operations.

The industrial crossing of a portion of the low productivity dairy cattle with bulls of specialized beef strains is promoting the accelerated development of and improvements in the productivity of the beef cattle. This year, industrial crossings will be carried out throughout the oblast using 50,000 cows and heifers.

In Orenburgskaya Oblast, the Kazakh Belogolovaya strain accounts for 97 percent of the available beef cattle. There is a small number of Hereford, Short Hoin and Kalmytskaya strain cattle (at one breeding farm). Pedigree bulls will be used for obtaining 2-3 pedigree hybrids.

Imported animals play a considerable role in the formation of the pedigree and productive qualities of the beef cattle. Since 1966, 671 head have been imported into the oblast. During this period, they have produced more than 5,000 calves. Some 1,400 young bulls alone have been obtained, raised and sold for breeding purposes to farms throughout the oblast and also beyond its borders. The Union Selection Center for Breeding Work in Beef Cattle Husbandry has been created at the Orenburg VNIIMS [All-Union Scientific Research Institute of Beef Cattle Husbandry].

During the past few years, improvements have been realized in the feed base. They have come about owing to improvements in the structure of the areas under crops, improvements in the agricultural practices employed in the cultivation of forage crops, the use of fertilizers and the introduction of progressive methods for procuring and preparing feed for feeding to the livestock. Feed preparation shops are available at a majority of the beef farms.

At the same time, the branch is beset by shortcomings and unresolved problems. In recent years the number of beef cattle in the oblast has been increasing only slowly and in some rayons there has even been a decrease. This has come about mainly owing to an increase in the herd of milking cows on the farms. Notwithstanding certain improvements in the feed base, individual kolkhozes and sovkhozes are still experiencing considerable feed shortages. Shortcomings are also being experienced in connection with

reproduction of the herd. Many farms are obtaining only 78-82 calves from every 100 cows and artificial insemination is being employed on only a small percentage (19.5 percent) of the brood stock. For all practical purposes, artificial insemination has been organized only at breeding farms, spetskhозes and individual complexes.

A great amount of work still remains to be carried out in connection with complex mechanization, particularly at industrial complexes and fattening sites; a good technology is still not available in all areas for the maintenance of beef cattle or for calving operations and solutions are required for the main problems concerned with the organization of and payments for labor. In addition, improvements are required in breeding operations.

The technology employed in the maintenance of beef cattle must be improved. The existing plans contain many bottlenecks. During the course of operating nine beef cattle complexes, it was established that the concrete structures used in construction, assuming the absence of forced ventilation, create a raised moisture content -- the walls and ceilings become covered with ice during the winter. In cow barns which according to the plan should be capable of maintaining 250 cows, no more than 160-180 are being maintained. The exercise yards are small and do not meet the zootechnical requirements for cattle maintenance. The cow barns lack artificial insemination stations and the separately planned standing stations are not being used owing to the fact that it is impossible to deliver the animals to them under a loose housing system of maintenance. The plans did not call for the installation of feeding troughs within the facilities and delivery yards are lacking. More efficient solutions must be developed for the progressive organization of herd reproduction operations and improved forms for the organization of labor must be found. It is because of these and other reasons that the complexes are failing to cope with the program called for by the RSFSR Ministry of Agriculture.

Experience and leading experience have shown that beef cattle require facilities of a less complicated type, with use being made of construction materials having good heat-insulating properties. Thus, based upon an experiment in the operation of fattening sites, fine service has been obtained from facilities the walls of which consisted of concrete slabs standing 1.5-2 meters above the foundation, with the remaining portion being of light weight. The walls were completed using wood or slate, with fibre-glass being inserted in the interspaces. The roof of the facility must be well heated. The facilities must be airtight and capable of accommodating no more than 120-140 cows. This will ensure optimum conditions for servicing the animals during both the summer and winter periods of maintenance.

It is our opinion that one standard plan should not be recommended for use in the breeding of beef cattle in different natural-climatic zones. The duration of the winter period, the temperature regime, the level of feeding

for the beef cattle, the mechanization level and so forth must be viewed as determinant conditions when developing the plan. The planning organizations must maintain close contacts with production operations and take advantage of accumulated experience in the maintenance of beef cattle when making a determination as to the type of facility and its technological purpose.

Improvements are required in the livestock maintenance technology employed at fattening sites. In view of the conditions which prevail during the winter months in Orenburgskaya Oblast, closed type sites are required.

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### PROGRESSIVE TECHNOLOGY FOR BEEF PRODUCTION OUTLINED

Moscow ZHIVOTNOVODSTVO in Russian No 8, Aug 80 pp 43-44

[Article by D. Levantin, professor and department head at All-Union Scientific Research Institute of Livestock Breeding: "Progressive Technology for Production of Beef"]

[Text] The constant growth in the production and consumption of beef, both abroad and in our country, has brought about an expansion in the scale of cattle fattening operations and in the conversion of such operations over to an industrial basis. Moreover, a sharp increase has taken place in the number of specialized fattening enterprises and in the numbers of cattle undergoing fattening regimes at such facilities. For example, during the 1970-1978 period alone, the number of cattle delivered to interenterprise fattening facilities for fattening purposes increased from 549,800 to 2.11 million head and gross production with regard to weight increases increased by a factor of 7.3. During these years, the average weight increase per animal during the fattening period increased from 80.5 to 155 kilograms. During the 1972-1980 period, 28 state complexes each capable of fattening 10,000 head of young stock annually were placed in operation.

Despite the great variety of modern specialized fattening enterprises, production operations are carried out at all of them by means of a complex of installations, machines and equipment concentrated at small sites, intended for the maintenance and fattening of animals, for the processing and storage of feed and for carrying out all of the necessary production processes, using only a small number of service personnel.

From an organizational-technological standpoint, all of the existing beef production systems can be combined into five technologies.

The first technology. This technology consists of a complete production cycle, including the raising of calves from 10-20 days of age and the fattening of young stock until they are sold for meat purposes. Depending upon the level of intensity, the young stock are delivered for slaughtering when they are 14-18 months of age and their live weight is 400-500 kilograms. Here, as a rule, the animals are maintained without pasturing in facilities

of the closed type having a controlled microclimate. In some instances and for the purpose of expanding the production volumes, some of the young stock are transferred during the spring and summer months to smaller facilities having interlinked pasture and feeding yards.

The second technology. This technology calls for the maturing and fattening of the animals up to an age of 16-18 months, as a single production process. In individual instances, where it is economically and administratively feasible to do so, the fattening operations are continued up to an age of 20 months. This is particularly profitable when use is made of young stock from the Siemmental'skaya, Shvit'skaya and black-variegated strains and also hybrids obtained from crossings of dairy cattle strains with bulls of the Charolaise, Kianskaya, Santa Gertrudis and Limuzinskaya strains, all of which are characterized by high energy, extended periods of growth and the capability to develop good muscle tissue in the absence of large deposits of fat throughout their bodies. Under this production system, the calves are raised at kolkhozes and sovkhozes until they are 4-6 months of age, at which time they are transferred to specialized farms for maturing purposes. Once the young stock have attained a live weight of 280-320 kilograms, they are assigned to final intensive fattening regimes.

The animals are maintained in facilities, with seasonal sites being used during the summer months. In those regions where adequate natural and especially cultivated pastures are to be found, pasture fattening can be employed successfully and mainly for the maturing of young stock. In the case of this technology and with regard to the feeding of the animals, silage, haylage and coarse and green feed containing a small proportion of concentrates are added to the rations during the maturing phase. The use of food industry waste products -- pulp or malt residues combined with other feed items -- makes it possible to turn over well prepared young stock for fattening purposes.

The third technology. This consists of fattening the cattle in closed facilities using waste products of the food industry combined with internally produced feed. Young stock having a live weight of 280-320 kilograms and also culled out adult animals are supplied to such enterprises for fattening purposes by other farms or specialized farms.

The fourth technology. This consists of fattening animals at fattening sites of various types having year-round or seasonal operations. It is carried out using rations consisting of silage, haylage, coarse feed and concentrates, with green feed being fed to the animals in large quantities during the summer months. During the autumn and winter period, the animals are fed full-ration feed mixtures in the form of granules or briquettes, containing up to 40-60 percent straw by weight that is treated with alkalis or ammonia.

The fifth technology. This technology consists of a complete production cycle, during which the raising of the young stock is carried out in

standardized facilities, with the animals subsequently being transferred over for fattening and marketing purposes in specialized fattening sites' facilities or in smaller sites having small facilities for dry bedding or cattle stalls.

An analysis of the operations of enterprises and farms having different technologies reveals that the highest technical-economic indicators of production are found at those farms which employ a complete production cycle, from the raising of the calves to the completion of the young stock fattening operations. At such enterprises the individual elements of the technology are organized fully and technologically combined completely into a single production process, the flow line and continuous production operations are clearly defined and highly efficient teams of operators and department and enterprise leaders on the whole are formed. In the case of this technology, the genetic potential of the most productivity of the cattle is utilized up to 90-95 percent. Paying, of special attention is the technology for breeding and raising the cattle as part of a single production process, during the implementation of which it is also possible to achieve high animal productivity and high technical-economic indicators of production through the selective use of mixed feeds -- pulp and malt residues and straw combined with silage, with relatively low expenditures of concentrates.

Under the conditions created by industrial production operations, greater use is made of rations containing fewer components; these rations can be combined into four principal types:

- silage-concentrate combined with coarse feeds, with the proportion of concentrates fluctuating from 35 to 40 percent;
- haylage-concentrate, with the concentrate proportion ranging from 30 to 35 percent;
- pulp or melt residue type of feeding combined with coarse feeds, silage, haylage and concentrates;
- forage-residue mixtures in liquid, granulated or briquetted form.

Stale and other waste products of mixed crop husbandry are utilized in the forage-residue mixtures, especially in granulated and briquetted form.

The conversion of beef production over to an industrial basis and the use of year-round lower maintenance for the animals require stability in the principal rations. This will make it possible to establish an optimum formula for the mixed feeds and pastures by phases and periods of cattle growth and fattening and at the same time it will promote the use of intensive production methods and improvements in the use of feed.

Industrialization of the raising and fattening operations is accompanied by a considerable increase in the consumption of mixed feeds, which is quite proper and direct. However, it by no means negates the importance of coarse and succulent feeds for cattle fattened cattle. When developing a system of

feeding. It must always be remembered that large-horned cattle are fully capable of converting plant and other types of low value feed into meat. Moreover, owing to the action of microorganisms in the rumen, ruminant animals are capable of utilizing lower quality protein and of substituting non-protein nitrogenous substances (urea and others) for up to 30 percent of the requirements for such protein.

Unfortunately, on some farms an attempt is being made to compensate for the shortage in coarse and succulent feeds and especially for their low quality through the use of concentrates. By no means can such action be justified either from a biological or economic standpoint. Thus the most important means for reducing the proportion of concentrates being fed to animals undergoing a fattening regime is that of raising the quality of the coarse and succulent feeds.

A reduction in the quality of hay, haylage or silage is usually caused by a disruption in the technology employed for preparing and storing them. A deviation from the established indicators for moisture content and temperature results in the development of undesirable microbiological and chemical processes. In the process, a breakdown occurs in the proteins and ammonia is formed, the turning taned of fats leads to the appearance of peroxides and aldehydes as well as ketones, the carotene disintegrates and the sugar and starch breaks down, as a result of which the digestibility of the nutrients decreases sharply.

Failure to observe the technology employed for procuring haylage and silage results in strong heating up of the fodder and hence to a reduction in the edibility and nutritional value of the food. Our studies have shown that the edibility of low quality haylage decreases by 20-28 percent and the consumption of dry substance is lowered by 31-35 percent compared to good quality haylage. The digestibility of silage protein when the temperature during the laying in period is  $40^{\circ}$  is 71 percent and when the temperature is  $10-60^{\circ}$  -- only 39 percent. The digestibility of dry substance and nitrogen-free extractive substances is lowered to a like degree.

Unfortunately, it bears mentioning that many farms are procuring large quantities of low quality silage, haylage and hay. In this regard, attention should be directed towards the need for having adequate numbers of silage trenches and for ensuring fulfillment of these recommendations associated with the technology for laying in haylage and silage. In addition, special attention should be given to the milling of the bulk, to its souring and tamping in the trenches, to the thorough covering of the trenches and to achieving a maximum degree of airtightness.

A greater amount of attention must be given to the construction of barns for the storage of hay, to the pressing of hay and to drying it by means of forced ventilation. Of equal importance is the need in all areas for carrying out the pressing of straw and for creating carry-over supplies of coarse feeds from year to year. Computations have shown that the

availability of fat cattle losses and subnormal. This will make it possible, assuming the same quantity of bulk feed, to reduce no less than 30-35 percent additional feed and to reduce sharply the consumption of concentrates. The use of successive changes of mixed feed to the animals during the same month causes great difficulties and quite often results in interruptions in the feed supply. Thus the switch of large complexes should ideally be fed at least one haylage throughout the entire year. The elimination of seasonal changes in the feeding of the animals precludes the possibility of a continuous taking place in the microflora structure in the rumen, caused by regular changes in the ration during the summer period. This will prevent the continued use of feeds and the development of high quality yearlings and by the end of the fattening period.

An important means for reducing the proportion of concentrates during the raising and fattening of cattle would be that of employing differentiated feeding during the raising and fattening phases. Experience carried out at the Voronezh farm revealed that the differentiated use of haylage-concentrate ratios. Thus, during the first 150 days of fattening, the proportion of concentrates was lowered considerably as a result of extensive feeding of haylage and subsequently it was raised to the technological norm during the final period. During the entire period of fattening, made it possible to reduce the consumption of concentrates by 23-32 percent per kilogram of weight increase and for a reduction in weight increase -- by 4-10 percent.

The concentrate proportion in rations can be reduced through the use of briquetted grass feeds. In terms of its nutritional value, such feed occupies an intermediate position between hay and concentrates and it is willingly consumed by the animals. Briquettes prepared from alfalfa and grass crops make it possible to carry out the fattening of animals successfully with minimal consumption of concentrates (25-40 percent) and to obtain a weight increase of 700-1,000 grams per 24 hours. The fattening of cattle on rations which combine straw briquettes with silage and concentrates is especially effective. The feeding of grass briquettes makes it possible to lower the consumption of concentrates by a factor of 1.5-2.

In the raising and fattening of young norm-cattle stock, a great amount of attention should be focused on the use of complete ration feed mixtures in the form of canaries and briquettes and containing straw (40-60 percent), grass meal and grain feeds in combination with protein-mineral premixes. The use of such granules serves to ensure that 900-1,000 grams of weight increase daily will be obtained from the animals with a high outlay of feed. The influence of the granules of straw treated with an alkali is especially effective. It raises the nutritional value of the granules by 40-60 percent or more. Treatment of the entire feed mixture with an alkali prior to granulation produces fine results.

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### ANIMAL HUSBANDRY SUCCESSES, PROBLEMS IN SOVIET NORTH

Moscow SEL'SKOYE KHOZYAYSTVO ROSSIi in Russian No 8, Aug 80 pp 11-12

[Article by M. Koshelev, chief of the Administration for the North of the RSFSR Ministry of Agriculture: "Successes and Problems of Agroindustrial Integration in the North"]

[Text] The party and government are displaying constant concern for economic development in the northern regions of our country. In recent years, the reindeer raising sovkhozes and kolkhozes in this region have undergone substantial development, the volume of construction has increased and improvements have been realized in material and technical support and in zootechnical and veterinary services for the rural and trade farms. This work must undergo further development in connection with the decree of the CPSU Central Committee and the USSR Council of Ministers entitled "Measures for Further Economic and Social Development of Regions Inhabited by the Nationalities of the North." These measures call for further complex economic development and improvements in the management of economic and cultural construction.

In addition to measures aimed at strengthening the material-technical base of branches of the processing industry and procurement organizations, special attention is being given to further developing the main sphere of labor application and a source for the material welfare of the indigenous population in the north -- the rural and trade economy.

At the present time, the average farm maintains 12,000 head of reindeer, from 15,000 to 40,000 head graze at 30 percent of the sovkhozes and kolkhozes, 250,000-300,000 rubles worth of furs are turned over to the state annually and each farm withdraws 100-150 quintals of fish from interior water areas. Such a concentration is long-range in nature, since only the large-scale specialized enterprises are capable of utilizing fully the biological and labor resources available in the northern regions or solving successfully the tasks of social-domestic reconstruction.

Meanwhile, a need has arisen in recent years for achieving cooperation among the sovkhozes and particularly in the interest of creating a reliable base

for the sale of oil, marketing of reindeer, the primary processing of storage of products and the production of fur and auxiliary goods. This new idea bears mainly upon the regions of developed reindeer raising: Yamalo-Nenetsky Autonomous Okrug and the Taimyr ASSR, where three agroindustrial associations were created based upon 30 sovkhozes.

Even the limited experience of these associations has confirmed the feasibility of the method adopted. Let us take for example one of the most difficult regions of Taimyr as reindeer raising is concerned -- Taimyr. Here great harm is being inflicted upon specialized reindeer raising by populations of wild reindeer, which migrate at will among the pastures of the farms. The Taimyr Agroindustrial Association, which was created in July 1978, succeeded within a brief interval of time in combining the efforts of sovkhozes and directing them towards solving the principal tasks concerned with the creation of a production base. The role played by specialists directly within the reindeer raising-trade brigades was raised considerably and a substantial expansion took place in the gathering up of wild reindeer and in the processing of raw materials. The delivery weight per head of domestic reindeer increased to 80 kilograms and that for large-horned cattle -- to 100 kilograms. Moreover, 89 percent of the reindeer and 94 percent of the cattle were sold in a high or medium state of nourishment. The productivity of the dairy cattle was raised. In 1979 the average milk yield per lactating cow was 3,300 kilograms, and the sales price for one blue-fur pelt increased to 60 rubles.

Improvements were realized in the work of organizing the procurement, sale and processing of wild reindeer products. This was promoted by the fact that reindeer were procured last year on an interenterprise basis by 12 consolidated brigades, with the indigent population comprising 80 percent of the personnel in these brigades. It was this factor which mainly ensured success. The plan for the last 2 years for supplying wild reindeer meat was fulfilled by 103.4 percent. The earnings from the sale of the products amounted to 1.7 million rubles. These changes exerted a positive effect on gross output. In 1979, 36 percent more such output was produced than in 1977. Overall, the administration's sovkhozes coped successfully with the plan for state procurements for 4 years of the current five-year plan.

The measures carried out made it possible to increase the quantities of leather and fur raw materials being obtained and they also served to raise the quality and increase the volumes of the goods being processed. This became possible owing to the extensive use of members of the families of reindeer breeders for performing work in the association's workshops. Today more than 200 individuals are engaged in producing 580,000 rubles worth of fur products annually. The leading workshop of the association, located in Dudinka, is carrying out its tasks successfully. Products valued at 400,000 rubles were produced and sold on an interenterprise basis. Based upon the work of this workshop, the plans for 1981 call for the construction of an interenterprise shop for the industrial processing of 35,000-40,000 pelts annually. The plan in operation of this enterprise will release nearby

sovkhoz workshops, thus having to employ primitive methods in the tanning of pelts and enable them to concentrate their efforts on the production of special fur clothing for the reindeer breeders, trade workers and other workers engaged in other branches of the national economy for the northern region.

Such rates of production are being reinforced by the development of auxiliary services. Over a period of 2 years, the association built refrigeration capabilities for 1,500 tons and construction is in progress on slaughtering stations and dressing sites. This will enable the sovkhozes to convert over gradually to early-autumn (September-October) schedules for the slaughtering of their reindeer, thus reducing meat losses to a minimum. In addition, the availability of slaughtering stations equipped with refrigeration units is making it possible to convert reindeer raising operations over to a more effective structure for the herd, including an increase to 60-65 percent in the proportion of does. Thus, an opportunity is at hand for increasing the number of calves born during the current year in the slaughtering contingent.

The situation with regard to pastures is improving. Calves under 5-6 months of age, obtained during the spring period, utilize mainly the green vegetation of pastures and in the autumn they are sent off for slaughtering. The winter reindeer moss and the more valuable and limited pastures are employed only for satisfying the requirements of the brood stock. Experience has shown that such a structure for the herd and the technology employed for raising the animals serve to increase the meat yield by 20-25 percent and an opportunity is presented for the planned production of fur "neblyuya." In turn, the production of goods made from this valuable raw material will make it possible to raise the efficiency of the branch by no less than twofold. Thus a substantial base is being created within the associations for the further development of agroindustrial integration and for solving problems of an economic and social nature in the national sovkhozes of the North.

The Sever Agroindustrial Association in the Yakut ASSR, which was also created in 1978, is justifying its title. In 1979, operating on an interenterprise basis, the 21 sovkhozes not only coped with the principal plans for the production and delivery of products to the state, but in addition and within a brief interval of time they resolved problems concerned with the planning for an interenterprise shop for the processing of leather and fur raw materials and they are successfully carrying out planning and modernization work on the sovkhoz workshops for the production of special fur clothing and other products for sales purposes.

Within the agroindustrial associations, successful solutions are being achieved for those problems concerned with the training of brigade leaders for reindeer raising operations and specialists in the processing of raw materials and the production of fur and souvenir products. A system of authorship is being employed extensively. Based upon a decision handed down by the Council of Directors, experienced farm leaders undertook to provide

support for socialist workship. As a result, three associations succeeded in advancing from the ranks of backward associations during a period of just one and a half years.

The experience of feeding farms is being introduced into operations on an extensive scale, especially at the Tomponskiy Sovkhoz for the pre-slaughtering short term (40-45 days) fattening of deer which did not graze on natural pastures. This is enabling the sovkhozes to raise the quality of 90-98 percent of the reindeer being delivered for slaughtering to a high or medium state of development, that is, to obtain 20-25 additional kilograms of high quality meat from each head. This represents a considerable reserve which considers that this method is presently being employed for fattening more than 70,000 reindeer at sovkhozes in the northern zone.

However, notwithstanding the positive aspects, the initial years of operations by the associations served to uncover substantial organizational shortcomings. For example, only limited use is being made of the opportunities available in the economic accountability office for transport-dispatch operations at the Yamal Association; its operations have still not been converted over to an interenterprise basis. Such offices have not yet been created at the Arktika and Sever associations and this is complicating considerably those problems concerned with material and technical supply for the sovkhozes. The same leaders and specialists are being distracted from carrying out their work and the administrative apparatuses of the sovkhozes are only slowly responding to the new requirements. All of these factors are exerting an adverse effect on the results being realized from the association's production-financial operations. In 1979, the sovkhozes experienced low production indicators.

Certainly, this is not being ignored. Recently the ministry listened to reports delivered by the management of the Yamal Association and the Agricultural Administration of the Tyumenskaya Oblast Executive Committee. It the latter pointed out the shortcomings in their operations and required the accelerated creation of a base for slaughtering the reindeer and for the industrial processing of the products of reindeer raising and the trades. In particular, mention was made of the weak work being carried out in connection with the modernization of the sovkhoz sewing shops and the construction of mechanized slaughtering stations and refrigeration units.

The sovkhozes of agroindustrial associations in the North will be confronted by great tasks during the Eleventh Five-Year Plan. They must build no less than 10 slaughtering stations having refrigeration units, five interenterprise shops for the industrial processing of reindeer leather and fur raw materials and 11 sovkhoz workshops for the production of fur and souvenir products. In addition, the plans call for the modernization of existing workshops. All of this will make it possible to realize more rapidly the potential and internal reserves for progressive production-economic relationships.

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## AGRO-ECONOMICS AND ORGANIZATION

### PROBLEMS OF EQUALIZING CONDITIONS OF ECONOMIC OPERATIONS DISCUSSED

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(Article by Prof Anatoliy Aleksandrovich Klyukach, doctor of economic sciences, head of section of Development and Location of Crop Raising of the Central Scientific-Research Institute of the Economic Institute attached to Gosplan RSFSR, and V. Klyukach: "Problems of Equalizing Conditions of Economic Operation")

[Text] In the USSR agriculture is engaged in on a tremendous territory. Natural-economic conditions of operation are diverse. The pertinency of this problem has been repeatedly pointed out by Comrade L.I. Brezhnev. "All the regulating state factors should contribute to kolkhozes and sovkhozes of the country with varying possibilities attaining approximately equal economic conditions of development."<sup>1</sup> Currently, the problem of creating equal conditions has assumed a national-economic character.

The July (1978) Plenum of the CPSU Central Committee gave much attention to questions of strengthening the agricultural economy, including equalizing economic conditions of operation. The plenum obliged the pertinent organs and organization "to constantly maintain at the center of their attention economic questions in agriculture, boosting efficiency of production and reducing cost of production as well as improving economic relations among sectors of the agroindustrial complex. These relations should contribute to the creation of a community and unity of interests of the state, the kolkhozes and direct producers of products and to serve as an active factor in the growth of labor productivity."<sup>2</sup>

The differences in levels of agricultural production are to be explained by diverse factors influencing the productive-operational activity of kolkhozes and sovkhozes, which can be united in natural and economic groups. Moreover, a distinction should be made between objective and subjective factors influencing production. It should be noted that in the process of intensification of agriculture a gap is created in the conditions of reproduction on farms located in different natural-economic zones. CPSU agrarian policy is aimed at reducing this gap.

At the present time, there is among economists no single opinion on or method of equalizing economic conditions of operation on kolkhozes and sovkhozes. Many propose achieving equalization with the help of a further and deeper differentiation of the purchase prices of agricultural products within republics, krais and oblasts. They recommend that this be done through establishing additions to prices for farms located under the worst conditions and also for those specializing in the production of products with low profitability. For example, A.A. Kalnyn' sh believes that "... two possible ways exist for a radical solution of these problems basically: differentiation of purchase prices for individual groups of farms or the establishment of a system of fixed payments with unified prices for the republic or zone."<sup>3</sup>

In our view, the system of fixed payments captures more precisely differences of economic operation. But for the determination of a system of economic key factors, natural-economic conditions of agricultural production, especially land, should be developed and evaluated. Analyzing objective differences in conditions of production, I.F. Suslov noted: "Even with a most thorough differentiation of purchase prices, it is practically impossible to take into consideration all objective differences in the conditions of production. Consequently purchase prices differentiated according to zones should be supplemented with more mobile and flexible financial factors of distribution of rent, making it possible to provide farms of all zones with comparatively equal conditions of reproduction."<sup>4</sup>

Some economists believe that the transfer of sovkhozes to full self-support will make it possible to equalize at more rapid tempi the production conditions of economic operation. But N.Ye. Smetanin has written: "As analysis shows the existing conditions of full self-support are found to be effective on farms with a high level of profitability and relatively well fitted out with fixed capital. Sovkhozes with low profitability, especially those operating at a loss, are poorly provided with fixed production capital and, under the new conditions of economic operation, lag behind in development economically strong sovkhozes. Moreover, this lag is increasing."<sup>5</sup>

Equalizing of economic conditions of operation should be achieved not only through regulation of purchase prices and rent relations but also through the improvement of the whole system of planning of agricultural production within the framework of the agroindustrial complex. Thus, V.N. Semenov notes: "Kolkhozes and sovkhozes existing under different conditions of production have a different level of cost of produced products. Thus, different possibilities of reproduction arise. In the regulation of these conditions a significant role is played by differentiation of purchase prices.

"Moreover, it is impossible to achieve with purchase prices alone different possibilities of reproduction for sovkhozes and kolkhozes existing under different conditions. In addition to prices, economic measures are used for the distribution and redistribution of net income created both in agriculture and in other sectors of the national economy through the price and finance-credit mechanism."<sup>6</sup>

For the future, it is necessary to aim at a rather complete equalizing for all kolkhozes and sovkhozes in the country's different natural-economic zones, but this can only be attained by the gradual bringing up of economically weak farms to the level of the pacemakers. It would be desirable for the leveling of economic conditions to be of a comprehensive character in the adopted decisions of planning and agricultural organs. For this reason, I. I. Lukinov notes the following directions for accomplishing the leveling of economic conditions of operation: regulation of production and income and also the development of interfarm associations. Moreover, in our opinion, it is necessary to work out recommendations for the equalizing economic conditions of operation at the intersectorial, intrasectorial and intraregional levels.

Equal economic and production conditions can be attained by providing farms on the basis of scientifically based norms with all the necessary resources regulated by plan and also by reaching a valid production volume and production growth. An important role is played by purchase prices which ensure an optimum norm of profitability from the cultivation of agricultural crops in the country's different zones.

Contemporary practices of planning of delivery of machines, fertilizers, chemical agents and also volume of capital investment take insufficiently fully into account the potential possibilities of further growth of production of agricultural products in individual oblasts, krays and autonomous republics. This has resulted in oblasts located in one economic region differing as of now in the level of provision of equipment--fixed capital and also in dosages of applied mineral fertilizers. Despite this, production output per unit of area does not differ significantly. For example, in the Ninth Five-Year Plan, kolkhozes and sovkhozes in Gor'kovskaya Oblast applied 2.2 times more mineral and organic fertilizers and were better supplied with equipment than Mordovskaya ASSR, while production output per hectare of agricultural fields varied only 20 percent to the benefit of the oblast in cost terms. Many such examples could be cited.

The possibility exists of a preliminary assessment of operational decisions when planning, for example, grain production. In the development of the RSFSR's grain economy over the near term, a group of most effective factors is in operation: chemical measures of fighting pests, diseases and weeds, developed crop rotations and also factors of average efficiency: new varieties, mineral fertilizers, wooded strips, drainage, irrigation, application of gypsum to and liming of soils. Organic fertilizers come under the low-efficiency factor. In this connection, the operations of a complex of factors differ in different regions. If for each zone of the RSFSR there be applied to a comparable area the entire complex of factors of growth of yield and it be compared as to the effect of its use, the following results are obtained (in percent): in the Northwestern Economic Region--75.4, Central--77.9, Volga-Vyatka--73.6, Central-Chernozem--96.2, Volga--76.1, North-Caucasus--100, Ural--88.6, West-Siberian--91.5; East-Siberian--67.5, Far-Eastern--69.8 and in Kaliningradskaya Oblast--82.2.

Thus, if the effect of the complex of factors in the North Caucasus be taken as 100 percent, the securing of a corresponding growth of yield in the Non-chernozem Zone would require an increase of resources of approximately 25 percent and in East Siberia and the Far East--30-32 percent. In the rest of the regions, these indicators are closer to that of North Caucasus. Analysis of the structure of the complex of factors in different zones showed that their first most effective group in grain farming is still not being adequately used. The relative share of areas treated with chemical agents against diseases, pests and weeds comprises less than 30 percent. The process of crop-rotation development has likewise not been completed. At the same time, new higher-yield varieties of wheat compared to the varieties of other grain crops had their share increased in the sowing of grain crops, but still the potential possibilities of the new high-productive varieties of wheat are still not being used fully.

In each economic region, however, a complex of factors is in operation which makes it possible to obtain the greatest efficiency only in the conditions of the given region. Whereas in the Nonchernozem Zone the best result is produced by treating areas with chemical agents against diseases, pests and weeds and also crop rotations, which have completed full rotation, new high-yield varieties of agricultural crops and mineral fertilizers, in the Volga region and the North Caucasus there are required to boost the effect irrigation, mineral fertilizers, new regionalized varieties of agricultural crops and wooded strips. A special approach is therefore required for each natural-economic zone.

The demand for capital investment will be different for the introduction of the complex of factors for the growth of grain production in the immediate future.

It is easy to determine from this grain output per 1,000 rubles of capital investment, which should be taken into consideration in planned regulation of the process of equalizing of grain-production conditions. Therefore, the planning of additional investment of resources for oblasts, krais and autonomous republics must be done comprehensively with account being taken of the projected size of growth of grain production and the production of other farming products. At the same time, first the sizes of growth of yield and gross outputs of grain and other agricultural crops should be planned and then the resources ensuring such growths.

This is achieved through preliminary comparisons of possible growths of production for the RSFSR as a whole and possible volumes of resources allocated to the republic for ensuring these growths. Thus, in 1980, it is planned for the RSFSR as a whole to produce 134 million tons of grain, or about 32 million tons more than the average obtained in 1971-1975. A comparison of the indicated volume of growth and of allocated resources that there will be produced for the RSFSR by 1980 through additional deliveries of mineral fertilizers 16.5 million tons of grain, through crop-rotation development--2.5 million tons, through the means of new varieties

—2.8 million tons and owing to the implementation of different kinds of water and chemical land improvement and other factors it would be possible to produce an additional 9.8 million tons. At the same time, average yield growth per hectare of grain sowings will amount to 3.5 quintals of grain for the RSFSR in 1980.

Thus, through a planned size of growth for each oblast, kray and autonomous republic, in the given case yield of grain crops, we can equalize the conditions of production. This is practically achieved through the determination of a greater or smaller addition to yield depending on the actually achieved average many-yeared yield calculated in such a way as to attain in the end an average size of growth of yield of grain crops for the RSFSR amounting to 3.5 quintals of grain.

Calculations make it possible to see that if on the average for the RSFSR growth of yield of grain crops, for example, because of additional mineral fertilizers, will amount to 51.5 percent in 1980, the figure for the oblasts and autonomous republics of the Nonchernozem Zone would be 55-60 percent. Thus yield of grain crops in 1971-1975 in the Nonchernozem Zone was 0.6 quintals per hectare lower than the average indicators in the RSFSR. In the immediate future, it is planned to obtain a yield in the Nonchernozem Zone that is 1-1.3 quintals per hectare higher than the average indicators in the RSFSR. More resources are correspondingly being allocated for the oblasts and autonomous republics of the Nonchernozem Zone.

An important factor in the equalizing of conditions of production exists in purchase prices for agricultural products. For the purpose of planned regulation of the economic relations of cost-accounting collectives with the state and the stimulation of the production of their products on kolkhozes and sovkhozes, it will be necessary to systematically (better once in a five-year period) implement an improvement of purchase prices. Moreover, only socially necessary expenditures for the production of agricultural products, reflecting the objective conditions of economic operation in various regions of the country, can serve as the basis of their improvement. But the determination of these expenditures is difficult. For a specific type of product, they can be expressed most closely by many-year average yearly production cost. Inasmuch as these data are not provided for most grain crops, the direct count method has been used, for example, for determining the production cost of winter barley. The annual report of a kolkhoz or sovkhoz contains the total amount of expenditures for the production of winter crops. Consequently if the sum of expenditures for the production of winter wheat and winter rye, which is also included in the annual report, be excluded from the total amount, the remaining sum of expenditures can only refer to winter barley.

The determination of the production cost of barley and oats makes for a more complex calculation. There are excluded from the total sum of expenditures for spring grain crops the amount of outlays indicated in the annual report for the production of spring wheat, buckwheat, millet, corn rice and legumes.

Table 1. Share of Grain Crops in Basic Indicators of Their Production in the BPSR, %

Коды типов (1)	(2) в землю slope		(3) в стоимость валовой производства		(4) в затраты		(5) в чистый доход	
	1966— 1976	1971— 1975	1966— 1970	1971— 1975	1966— 1970	1971— 1975	1976— 1978	1971— 1975
(6) Озимая рожь	15.2	16.3	20.1	14.0	14.5	18.7	12.9	15.9
(7) Яровая рожь	38.7	31.5	25.6	41.9	33.6	27.9	37.6	26.0
(8) Озимая пшеница	9.4	7.6	6.1	10.7	8.6	6.8	12.7	7.4
(9) Озимая ячмень	1.1	1.3	1.0	0.7	0.8	0.9	0.6	0.6
(10) Яровой ячмень	16.8	22.9	27.3	12.4	19.0	23.5	14.9	20.1
(11) Овес	9.3	11.3	11.9	7.4	10.3	11.4	9.3	12.4
(12) Кукуруза	1.6	1.6	1.8	1.3	1.3	1.7	1.6	1.6
(13) Горох	1.6	1.5	1.2	1.6	1.3	1.0	1.8	1.5
(14) Грецкий орех	0.8	0.6	0.4	2.6	2.0	1.3	1.5	0.9
(15) Зернобобовые	0.5	0.9	0.9	3.7	5.9	3.1	2.6	2.2
(16)	4.8	4.5	4.5			4.0	5.7	4.5
							5.6	5.1

Key:

- (1) Crops
- (2) In gross yield
- (3) In cost of gross production
- (4) In expenditures
- (5) In net income
- (6) Winter wheat
- (7) Spring wheat
- (8) Winter rye
- (9) Winter barley
- (10) Spring barley
- (11) Oats
- (12) Corn
- (13) Millet
- (14) Wheat
- (15) Rice
- (16) Legumes

Table 2. Price-List Purchase Prices for 1976-1980 and Accounting Purchase Prices in the RSFSR, %

Показатели и районы (1)	Однокл. пшеница (2)		Яровая пшеница (3)		Озимая рожь (6)		Ячмень (7)		Овес (8)	
	затраты по предприятию руб. (2)	посевные руб. (3)	затраты по предприятию руб. (2)	затраты по предприятию руб. (3)						
	руб. руб. (2)	руб. руб. (3)	руб. руб. (2)	руб. руб. (3)	руб. руб. (2)	руб. руб. (3)	руб. руб. (2)	руб. руб. (3)	руб. руб. (2)	руб. руб. (3)
(9) РСФСР, руб. за 1 т.	93.8	80.0	109.6	102.3	110.7	136.9	87.8	94.1	96.5	113.3
(10) %, в том числе:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
(11) Северо-Западный	133	283	114	214	126	163	142	220	130	198
(12) Центральный	133	181	114	107	126	124	142	122	130	117
(13) Волго-Вятский	133	197	114	121	126	122	142	140	130	126
(14) Центрально-Черно- земный	103	97	89	68	77	61	76	72	69	63
(15) Поволжский	109	116	93	92	78	69	88	94	80	76
Северо-Кавказский	88	79	76	77	66	56	64	60	58	59
(16) Уральский	119	161	102	99	104	108	110	161	101	98
(17) Западно-Сибирский	—	—	103	96	84	68	90	103	80	84
(18) Восточно-Сибирский	—	—	105	109	89	96	96	111	87	97
(19) Дальневосточный	—	—	116	171	117	112	139	169	126	141
(20) Калининградская область	133	180	114	123	126	102	142	141	130	122

Key:

(1) Indicators and regions	(11) Northwestern
(2) price-list purchase price	(12) Central
(3) accounting purchase price	(13) Volga-Vyatsk
(4) Winter wheat	(14) Central Chernozem
(5) Spring wheat	(15) Volga--North Caucasus
(6) Winter rye	(16) Ural
(7) Barley	(17) West-Siberian
(8) Oats	(18) East-Siberian
(9) RSFSR, rubles per ton,	(19) Far-Eastern
(10) in percent, including:	(20) Kaliningradskaya Oblast

The rest of the sum is divided up among barley, oats and other grain crops with the help of a formula which uses actual yield, production cost and labor outlays averaged for all spring grain crops as well as yield and labor outlays for a determinable crop. The determinable production cost of a crop will be directly proportionate to the level of labor outlays and inversely proportionate to the yield level. It was possible in this way to determine the production cost of all grain crops and to achieve comparable economic indicators.

The value of an improvement of purchase prices for grain crops and the results achieved in the Ninth and Tenth Five-Year Plan compared to the Eighth Five-Year Plan may be judged on the basis of the data of an analysis of the relative weight of each grain crop in the gross yield--cost of gross production and in expenditures and net income presented in Table 1.

Therefore, in the 1970-1975 and Ten-Year Five-Year Plans, the production of spring wheat, winter rye, buckwheat, rice and legumes was stimulated to a large degree by purchase prices, but the production results obtained did not correspond to the true cost of the grain crops to the created economic conditions. For example, there was a significant growth of the relative share in production, and a high norm of profitability for the production of rice. The raising of purchase prices for barley and oats adopted in 1972 and subsequent years for the oblasts of the RSFSR Nonchernozem Zone had a favorable effect on increasing the production volume of these crops and improving somewhat indicators of profitability level. Barley and oats production-level indicators would be significantly better given the condition of establishment of quasi-prices for wheat and barley (oats) and spread of these prices to other oblasts of the RSFSR.

Stimulating prices were not set for winter wheat. It was, however, one of the few grain crops which was shown to be highly effective in the use of own areas and with a high norm of profitability. These results were achieved thanks to a relatively high yield and very low production cost (not counting winter barley) of this crop.

The problem of equalizing economic conditions of production is likewise connected with the establishment of firm plans of grain plans and incentive prices for its quality and also potential possibilities of regionalization and of new, high-yield varieties of grain crops, introduced into production. The establishment of stimulating purchase prices, for example, for buckwheat and winter rye did not produce the desired results, although purchase prices for buckwheat exceed threefold the level of prices on the average for grain. The chief reason is the lack of new high-yield varieties, especially of wheat.

The creation of equal economic conditions of production is to a significant degree determined and regulated by a valid relationship of purchase prices for separate grain crops grown in different oblasts and regions. It is reflected in net income per sown hectare in the norm of profitability. The smaller the net purchase norm of profitability and yield of net income per sown hectare of different grain crops, the better the relationship of the level of purchase prices for these crops. Consequently, if the average many-year norm of profitability for the RSFSR, reflecting socially necessary expenditures of production, is used as a basis of calculation of an optimum relationship of the level of purchase prices, then, knowing actual or validated normative outlays per sown hectare, it would be possible to determine the actual relationship, but, however, without consideration of markups for quality indicators.

The use of average realized purchase prices for the evaluation of the cost of gross production in connection with the yearly change of their levels may have a negative effect on the relationship of accounting purchase prices. The calculation of the relationship of purchase prices based on an average norm of profitability of grain crops of 64.2 percent for the RSFSR is presented in Table 2.

Consequently, the cited calculations permit the conclusion of a need for improving the relationship of purchase prices in the majority of the economic regions. The interests of the matter require a certain reduction of the level of prices for winter and spring wheat and an increase of that of grainforage crops and winter rye. It would be advantageous to achieve an improvement in production and the economic conditions of production in oblasts, kraya and autonomous republics in the preplan period with the working out of the next draft of the five-year plan of agricultural development.

#### FOOTNOTES

1. L.I. Brezhnev, "Leninskij kursom. Rechi i stat'i" (Leninist Course. Speeches and Articles). Vol. 1. Politizdat, 1970, p 82.
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## TILLING AND CROPPING TECHNOLOGY

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### MEASURES FOR IMPROVING QUALITY OF GRAIN DISCUSSED

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(Article by I. P. Korobov, chief specialist of USSR Ministry of Agriculture: "Only High Quality Products for the State")

[Excerpt] During 4 years of the Tenth Five-Year Plan, the kolkhozes and sovkhozes achieved fine successes in the production of strong wheat. On the average for the 1976-1979 period, the procurements of such wheat exceeded the planned tasks by a factor of 1.7. This was achieved mainly as a result of the implementation, at the kolkhozes and sovkhozes, of a complex of agrotechnical and organizational measures aimed at improving the quality of the grain.

Just as in the past, the Kazakh SSR occupies a leading position among the principal grain growing republics in terms of strong wheat procurements. Compared to the Ninth Five-Year Plan, the procurements of such wheat in this republic, on the average for the 1976-1979 period, increased by a factor of 1.9. The farms in Kustanayskaya, Turgayskaya, Tselinogradskaya and Kokchetavskaya oblasts are selling large quantities of strong wheat to the state.

The kolkhozes and sovkhozes in the Russian Federation have carried out a considerable amount of work in connection with increasing the procurements of strong wheat grain. On the average for 4 years of the current five-year plan, the state's granaries were supplied with 1.9 million tons, or 4.4 times more than the average for the Ninth Five-Year Plan. A great contribution is being made by the kolkhozes and sovkhozes in Krasnodarskiy Kray. Here the average annual sale of strong wheat to the state amounted to 755,000 tons, or 39 percent of the procurement volume for the RSFSR.

The farms in Omskaya Oblast achieved high results during 1979. The procurement plan for this crop was over-fulfilled by a factor of six, and in terms of volume of sales to the state the oblast took over second place in the republic behind Krasnodarskiy Kray. In addition to carrying out an entire complex of agrotechnical measures, great importance is attached here

to conducting a preliminary evaluation on the quality of the grain and forming up the batches of wheat based upon the gluten content and quality and upon other indicators.

In solving this important problem, the farms are being furnished with a great amount of assistance by SibNIKhod (Siberian Order of the Red Banner of Labor Scientific Research Institute of Agriculture) which, jointly with the Sibiryak Sovkhoz, is located in Russko-Polyanskiy Rayon. This institute developed a scientifically sound system for controlling the quality of wheat throughout its path leading from the fields to the grain receiving enterprises. In this manner the mixing of different quality batches of grain is eliminated on the farms and mistakes made in determining its quality in the laboratories of the grain receiving enterprises are eliminated. For the purpose of carrying out this work, a service for controlling the quality of the grain is created in advance. Towards this end and prior to the commencement of the harvest work, the leader of a farm approves a grain quality committee and issues a task calling for the organization of a laboratory for analysing the grain and for an inspection brigade. The brigade collects samples of the grain from the plantings prior to harvesting of the crop and also from clamps on the threshing floors. When necessary, the batches of grain are dried out and cleaned. The quality standardized wheat is sold at raised prices, with no reduction from the physical bulk and with no payment for refection.

The complex introduction of agrotechnical and organizational measures has enabled the Sibiryak Sovkhoz to increase considerably its production and sale to the state of strong wheat, as borne out by the data shown in the table.

The Ukrainian SSR has still not achieved stable production and procurement operations for high quality grain. In 1979, against a plan calling for 130,000 tons, only 57,000 tons of strong wheat, or 44 percent, were sold to the state. The kolkhozes and sovkhozes in Zaporozhskaya, Kirovogradskaya and Nikolayevskaya oblasts did not participate in procuring the grain of this crop. In Nikolayevskaya Oblast, the procurement plan for strong wheat was not fulfilled for 4 years of the Tenth Five-Year Plan: against an overall plan calling for 30,000 tons, only 200 tons were sold. Certainly, the problem is not caused by the natural conditions, but rather it derives from the fact that the oblast's kolkhozes and sovkhozes are not devoting proper attention to the organization of production and procurement operations for the grain of this crop. In particular, insufficient importance is being attached here to conducting a preliminary evaluation of the quality of the wheat on the farms or to the formation of the batches, for the purpose of preventing the intermixing of different quality wheats. Additional and large quantities of high quality grain can be sold to the state only if such preliminary evaluations are organized in a fine manner at the kolkhozes and sovkhozes.

The farms in the neighboring Odesskaya Oblast are successfully cultivating strong wheat. During the 1976-1979 period, against an overall plan calling

for 1977-1978, they sold 112,000 tons of strong grain, or 2.3 times more, to the state.

An unsatisfactory situation still prevails throughout the country with regard to the procurement of durum wheat grain, which amounted to an average of 2.9 million tons for the 1966-1970 period, 2.1 million tons for 1971-1975 and 1.9 million tons for the 1976-1979 period. Over the past 4 years, an average of 376,000 tons of durum wheat (first class), or 45 percent of the plan, were obtained and in 1979 - 642,000 tons or 38 percent of the plan. Compared to the Ninth Five-Year Plan, the procurements of first class grain increased by an average of only 80,000 tons during 4 years of the Tenth Five-Year Plan, with the indebtedness to the state amounting to 2.89 million tons. This situation with regard to durum wheat procurements developed owing to the fact that the local agricultural organs and the leaders of kolkhozes and sovkhozes in the Russian Federation and Kazakhstan failed to devote proper attention to the production of this crop.

In recent years, the kolkhozes and sovkhozes in Altayskiy Kray and in Kuybyshevskaya, Saratovskaya, Volgogradskaya, Orenburgskaya, Chelyabinskaya, Vostochno-Kazakhstanskaya, Semipalatinskaya, Kokchetavskaya, Ural'skaya, Tselinogradskaya and Seversk-Kazakhstanskaya oblasts have reduced sharply their durum wheat sowing areas.

Work concerned with increasing the production and sale of durum wheat to the state in Kustanayskaya Oblast is proceeding in a very unsatisfactory manner, despite the fact that the plans call for this oblast to produce and procure almost one-half of the total procurements of this crop in the Kazakh SSR. Here the plantings have been reduced from an average of 354,000 hectares during the 1966-1970 period to 47,400 during the 1976-1979 period, a reduction of 7.5 times. In 1979, durum wheat was grown on 62,000 hectares and against a plan calling for 250,000 tons only 59,000 tons or 24 percent were procured. During 4 years of the Tenth Five-Year Plan, the obligation to the state amounted to 634,000 tons.

The plan for brewing barley procurements was almost fulfilled during 4 years of the Tenth Five-Year Plan. However, in 1979 many kolkhozes and sovkhozes failed to supply the state with sufficient quantities of this crop, particularly farms in the Russian Federation. Last year the procurement plan for brewing barley was fulfilled by only 10 percent in the RSFSR.

This was caused mainly by complicated weather conditions. However, other factors also played a role. In the procurement zones for brewing barley, this crop is annually grown on large areas (in excess of 10 million hectares) and the gross production of its grain is fully capable of satisfying the requirements of industry. However, the requirements of the brewing plants for quality-standardized barley are not being satisfied fully. Actually, the kolkhozes, sovkhozes and grain receiving enterprises are devoting very little time to organizing the work concerned with the formation of batches of high quality grain, post-harvest processing and improving the grain in terms of both moisture content and size.

Year	Sowing Area for Strong Varieties of Wheat (hectares)	Gross Yield of Strong Wheat (tons)	Prop. of Strong Wheat Varieties in Overall Plantings of This Crop (%)	Late Nitrogen Top Dressings (hectares)	Wheat Sold To the State			Bonuses Obtained for Quality		
					Including			Total		
					Strong	Weak	Valuable (tons)	Tons	%	of rubles)
1974	10,300	12,257	84	-	8,465	-	-	4,723	46.6	5-56
1975	12,200	10,612	90	-	6,965	1,549	22.2	4,892	92.5	14-36
1976	12,550	14,227	94	700	8,257	3,298	39.9	3,955	152.1	20-97
1977	13,065	21,185	98	3,000	14,250	7,232	50.7	6,693	3000.3	21-51
1978	12,970	18,104	97	5,000	12,126	11,927	98.4	199	361.4	31-45
<b>1979</b>	<b>13,400</b>	<b>33,130</b>	<b>93</b>	<b>5,500</b>	<b>27,527</b>	<b>15,525</b>	<b>45.5</b>	<b>10,574</b>	<b>512.3</b>	<b>22-01</b>

Last year, i. e. the RSFSR, 18,000 tons of brewing barley marked by deviations from the established requirements in the indicator for grain size were procured (Voronezhskaya, Tambovskaya, Belgorodskaya and other oblasts). Ukrainian SSR -- 15,000 and in the Lithuanian SSR -- 17,000 tons.

The quality of the grain obtained from groat crops is dependent to a large degree upon the organization of the harvesting and post-harvesting processing operations. Importance is attached to harvesting the crops in a timely manner and to ensuring that the harvesting and grain cleaning machines are properly adjusted. This will serve to prevent crushing, hulling and spoilage of the grain. In the event of a raised content of grain or weed impurities, the kolkhozes and sovkhozes must pay considerable amounts for refaction or they must sell their grain at the price for feed barley. According to data supplied by the USSR Ministry of Procurements, in 1979 the kolkhozes and sovkhozes were paid the feed barley price for 9,000 tons of rice containing more than 35 percent grain and weed impurities. Seven thousand tons of such rice were delivered to state granaries in the RSFSR, mainly in Krasnodarskiy and Primorskiy krays and in Astrakhanskaya Oblast. In addition, large quantities of this rice are being used on the farms for feed purposes.

In 1979, valuable varieties of millet occupied 84 percent of the overall millet plantings and only five percent of the millet procurements. This underscores the fact that large quantities of the grain obtained from this crop are being delivered to the state in hulled and crushed condition and containing spoiled grains and difficult to separate out impurities. Sixty four thousand tons of such grain were procured in the Russian Federation, mainly in the Bashkir ASSR and in Tambovskaya, Penzenskaya and other oblasts.

The reasons for the sale of substandard grain to the state are as follows: untimely harvesting and processing of the crops, incorrect adjusting of the working organs and machines to the required work regime and unsatisfactory condition of the combines. In the interest of improving the quality of the grain, great importance is attached to ensuring correct adjustment of the thrashing unit and the wind-screen cleaning equipment. Greater grain damage occurs when the frequency of rotation of the drum is increased. The completeness of the thrashing work must be ensured mainly by reducing the clearances between the drum and the concave. If this does not produce the required degree of completeness of thrashing, then the frequency of rotation of the drum should be increased. In the event of improper adjustment of the cleaning operations, the output of loose grain to the grain screw conveyer may reach up to 40 percent of the crop. In order to reduce damage to the millet, the output of loose grain to the grain screw conveyer must be reduced to the maximum possible degree. This can be accomplished by further opening the upper and lower cleaning sieves and by reducing the frequency of rotation of the blower.

The kolkhozes and sovkhozes have all of the opportunities at their disposal for carrying out the task of the Tenth Five-Year Plan with regard to selling

high quality grain to the state from wheat, brewing barley and groat crops and other more valuable varieties of grain crops. This requires first of all the formation of improved batches of grain and the establishment of strict control over the harvesting, processing and shipping operations and over the analysis of grain quality during procurement work.

In the interest of improving the quality of grain, the USSR Ministry of Agriculture, the USSR Ministry of Procurements and the USSR Ministry of the Food Industry have approved for 1980 the following varieties (not furnished in this article) of strong wheat and brewing barley and also some of the more valuable (in terms of quality) grain and pulse crop varieties, the grain of which is paid for at raised prices provided its quality meets the established requirements.

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